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**Notice of Allowability**

Application No.

10/707,517

Examiner

Toniae M. Thomas

Applicant(s)

HU ET AL.

Art Unit

2822

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to the amendment filed on 24 Sep 2004.
2. ☒ The allowed claim(s) is/are 1-5, 7-16 and 18-21.
3. ☒ The drawings filed on 19 December 2003 are accepted by the Examiner.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) ☐ All    b) ☐ Some\*    c) ☐ None    of the:
    1. ☐ Certified copies of the priority documents have been received.
    2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
  6. ☐ CORRECTED DRAWINGS ( as "replacement sheets") must be submitted.
    - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review ( PTO-948) attached
      - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
    - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date \_\_\_\_\_
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☒ Interview Summary (PTO-413), Paper No./Mail Date \_\_\_\_\_
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other \_\_\_\_\_

  
AMIR ZARABIAN  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2800

**EXAMINER'S AMENDMENT**

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in an email response and a faxed response, both of which were received from Mr. Winston Hsu on 01 October 2004.

The application has been amended as follows:

**In Claims**

Claim 1, line 11, "or a tungsten layer" has been deleted after  
"aluminum layer";

Claim 13, line 12, "or a tungsten layer" has been deleted after  
"aluminum layer";

***Reasons for Allowance***

2. The following is an examiner's statement of reasons for allowance: the prior art of record does not anticipate or render obvious a method for forming a wire on a substrate or a dual damascene wire on a substrate substantially as claimed. For example, the Werkhoven pre-grant published application (US 2001/0041250 A1), made of record in the Office action mailed on 30 June 2004, discloses a method for forming a wire on a substrate, a dual damascene

wire to be exact. As stated in the action, Werkhoven discloses forming a continuous and uniform conductive layer 434 on a surface of a barrier layer 432 (figs. 9, 10, and par. 101, lines 1-3), and forming a seed layer 436 on a surface of the conductive layer (figs. 9, 10, and par. 101, lines 1-3). The seed layer comprises a copper layer, and the barrier layer comprises a conductive nitride layer, more preferably a metal nitride layer (e.g. tungsten nitride (WN)). The conductive layer, which serves as a transition layer between the barrier layer and the seed layer, comprises a graded tungsten copper nitride layer (par. 102, lines 3-6).

Whereas Werkhoven discloses interlaying the conductive layer between the seed layer and the barrier layer, Werkhoven fails to anticipate, teach or suggest forming the conductive layer comprising an aluminum layer, as recited in claims 1 and 13. As stated above, the conductive layer 434, which serves as a transition layer between the metal nitride barrier layer 432 and the copper seed layer 436, comprises a tungsten copper nitride layer. There is no teaching or suggestion to use an aluminum layer, in place of the tungsten copper nitride layer, as a transition layer between the metal nitride barrier layer and the copper seed layer.

There are no outstanding issues. Accordingly, the current application is in condition for allowance.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should

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preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Toniae M. Thomas whose telephone number is (571) 272-1846. The examiner can normally be reached on Monday-Thursday from 8:30 a.m. to 5:30 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amir Zarabian can be reached on (571) 272-1852. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

*MMJ*

01 October 2004

  
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